

Environmentally Protective Fabrics for Spacesuits, Phase I

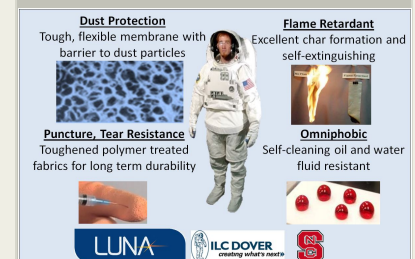
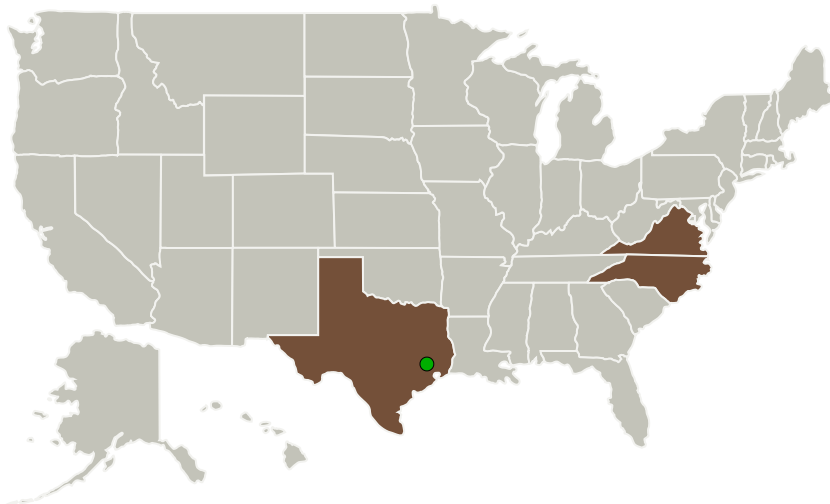
Completed Technology Project (2016 - 2017)



Project Introduction

Luna is addressing NASA's need to develop new multifunctional textiles for improved Environmental Protection Garments (EPG). Previous protective suits such as the Apollo era EPG or currently used Extravehicular Mobility Unit (EMU) provide thermal and micrometeoroid protection, but are intended only for short duration use. NASA plans for a future manned Mars mission will potentially require extended protection for up to 500 days. Critical capabilities for these textiles include improved i) dust mitigation to protect from potentially corrosive or abrasive particles in the Martian regolith, ii) cut and puncture resistance to protect the suit bladder from damage from sharp edges of tools and rocks, and iii) durability for extended use. Luna will develop a multifunctional textile composite that will achieve these stringent goals, while maintaining comfort and mobility. Our team will combine several well developed technologies into a practical textile design, which will provide excellent protection from dust, fire, chemical exposure, and cut/puncture. These will be integrated to minimize weight and maximize flexibility such as to not prohibit, degrade, or interfere with the use of equipment.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Luna Innovations, Inc.	Lead Organization	Industry	Roanoke, Virginia
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas
North Carolina State University at Raleigh	Supporting Organization	Academia	Raleigh, North Carolina

Primary U.S. Work Locations

North Carolina	Texas
Virginia	

Project Transitions

▶ **June 2016:** Project Start

✓ **June 2017:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140054>)

Images



Briefing Chart Image

Environmentally Protective Fabrics for Spacesuits, Phase I
(<https://techport.nasa.gov/image/126630>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Luna Innovations, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

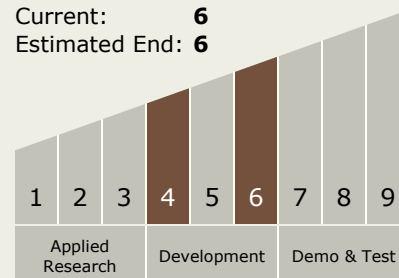
Carlos Torrez

Principal Investigator:

Bryan Koene

Technology Maturity (TRL)

Start: 4
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
 - └ TX06.2 Extravehicular Activity Systems
 - └ TX06.2.1 Pressure Garment

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System